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area, or isocenter, of an MRI unit, where B_0 reaches its maximum. On the other hand, if the described magnet arrangement is exposed to a nonhomogeneous magnetic field such as one generated by an external magnet configuration similar to the internal magnet configuration, an attractive force results. Consequently, this design will reduce the torque over the whole area of the static magnetic field of the MRI unit to negligible values.

Since the dimensions of common implanted systems are comparatively small, the distance between the two internal magnets is small, and the residual torque on this arrangement will also be negligible in the fringe field of the MRI unit as illustrated in FIG. 9 wherein the measured torque on a conventional internal magnet is shown as a function of the distance to the isocenter with the magnetic moment perpendicular to the static magnetic field B_0 . Line 28 represents the torque as a function of the isocenter in the conventional head position. The dotted line 29 represents the calculated torque with the measured scanner magnetic field and the magnetic moment of the internal CI magnet. The CI magnet has a magnetic moment of 0.11691 Nm/T. Line 30 represents the calculated torque for the interference-free magnet configuration disclosed in this specification with a distance 27 of 11 millimeters between the two magnets. An added advantage of this configuration is that the two internal magnets would be less sensitive to partial demagnetization because of a more suitable ratio of the magnet dimensions.

It should be noted that it has been contemplated that in a further embodiment of the present invention, the total torque

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on a magnet of the implant may be reduced to residual values, and partial demagnetization may be prevented, by enabling the magnet to align with an external magnetic field.

What is claimed is:

1. A coil system in an implantable prosthesis for receiving electromagnetic waves from an external transmitter, the system comprising:

two coils of identical inductance, adapted to be positioned substantially equidistant from the external transmitter, the coils connected such that the winding direction of one coil is antiparallel to the winding direction of the other coil, and such that the sum of the voltages induced in the coils by a homogeneous electromagnetic field is substantially equal to zero.

2. A coil system according to claim 1, wherein the system receives both power and stimulation data from an external transmitter.

3. A coil system according to claim 2, wherein at least one coil is positioned outside a housing of an existing coil, the positioned coil and the existing coil having identical areas.

4. A coil system according to claim 1, wherein the system is adapted to operate at a frequency:

- (a) greater than or equal to 2 MHz, and
- (b) less than or equal to 50 MHz.

5. A coil system according to claim 1, further including a magnetic reed switch arrangement for providing overvoltage protection in the presence of a magnetic field.

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